CITY OF BATON ROUGE
PARISH OF EAST BATON ROUGE

DEPARTMENT OF HUMAN RESOURCES

# Study Guide

Engineering Aide Trainee
Written Examination

- This booklet contains SAMPLE QUESTIONS ONLY. Studying this booklet will not necessarily improve your exam score.

## PURPOSE AND CONTENT OF THIS EXAM PREPARATION GUIDE

This guide was developed to help you prepare to take the written examination for Engineering Aide Trainee. It contains general exam-taking advice and also provides specific information related to the exam content. This information includes the subject areas covered by the exam, the kinds of questions to expect, strategies for approaching the questions, and sample questions. Though this information cannot guarantee a higher exam score, it can give you direction for your examination preparation that will assist you in doing your best.

## PREPARING TO TAKE THE EXAMINATION

### Before the Day of the Examination

- Review this guide to get familiar with the content of the examination. Knowing about the topics and kinds of questions that will be in the exam will ensure that you will not be surprised by the content of the examination or the manner in which it is presented. This can improve your ability to demonstrate your job potential.

- Make sure that you know where the examination will be administered and all of the relevant details, such as where to park, where to report for the exam, and what identification is required.

### On the Day of the Examination

- Make sure that you are well rested and have eaten. These things will help your concentration during the examination.

- Plan your day to allow plenty of time to get yourself prepared and get to the exam site. Allow enough time to cope with weather, traffic, parking, etc. Hurrying creates anxiety, so do not put yourself in the position of having to hurry.

- Listen carefully to all instructions from the examination administrator. Make sure that you understand the instructions and carry them out correctly. Ask questions at the proper time before the exam begins if you are unsure of any aspect of what you should do during the exam.

## GENERAL EXAM TAKING TIPS

- Use your time carefully. The time limit should provide you with more than enough time if you move through the exam steadily and do not spend too much time on any one question.

- Read the questions and answer choices carefully. Read all of the answer choices before you select an answer.

- If you come to a question that is especially difficult, skip that question and come back to it later if you have time.

- Answer every question. Scores are based on the number of correct answers. You will receive no credit if you leave an answer space blank. It is to your advantage to use your best judgment to make a choice among the answer choices provided.

## ENGINEERING AIDE TRAINEE

The written examination for Engineering Aide Trainee is based on a job study that identified the most important knowledge, skills, and abilities required to perform the job successfully. These areas include:

- your ability to understand and solve arithmetic problems
- your knowledge of basic engineering terminology
- your knowledge of basic land surveying concepts
- your ability to read and follow written instructions

All of the examination questions are presented in a multiple-choice format. Each question is identified by a question number that is followed by a question statement. After the question statement, there are between two and four answer choices. You should read all of the answer choices and then choose the best answer. **Each question has only one correct answer.**

## EXAMINATION SECTION 1: ARITHMETIC REASONING

This examination section contains thirty-four (34) questions that require the use of arithmetic reasoning skills and involve the application of basic arithmetic operations including fractions, percentages and averages. An effective strategy for answering these kinds of questions starts with the careful reading of each question. Make sure that you understand exactly the outcome asked for in the question. Attend to words or phrases like "the same as", "total", "smallest", "percent", and similar language that indicate the focus of the task. Always check the accuracy of your calculations.

Depending on your current knowledge and recent experience performing computations, you may want to spend some preparation time reviewing references on some computation topics, for example, calculating averages and percentages, and performing arithmetic operations on fractions.

Examples of these types of questions are shown below. The sample questions are followed by brief explanations of their correct answers.

1. Which of the following numbers is the same as $5^1/_5$?

   A. 5.15
   B. 5.20
   C. 5.25
   D. 5.50

**Answer:** The correct answer to sample question #1 is answer choice "B". The fraction portion of $5^1/_5$ needs to be converted to its decimal equivalent. This is done by dividing the numerator by the denominator: $1 \div 5 = .20$. This is added to 5 and the answer to the question is 5.20, which is answer choice B.

2. In a five day week, the daily number of work orders received in the maintenance department were: 21,17, 31, 19, and 22. The average number of work orders per day for this week is closest to which of the following values?

   A. 22
   B. 23
   C. 24
   D. 25

**Answer:** The correct answer to sample question #2 is answer choice “A”. To compute the average value, the sum of the five individual values is divided by the number of values: (21 + 17 + 31 + 19 + 22) ÷ 5 = 110 ÷ 5 = 22. This is answer choice “A”.

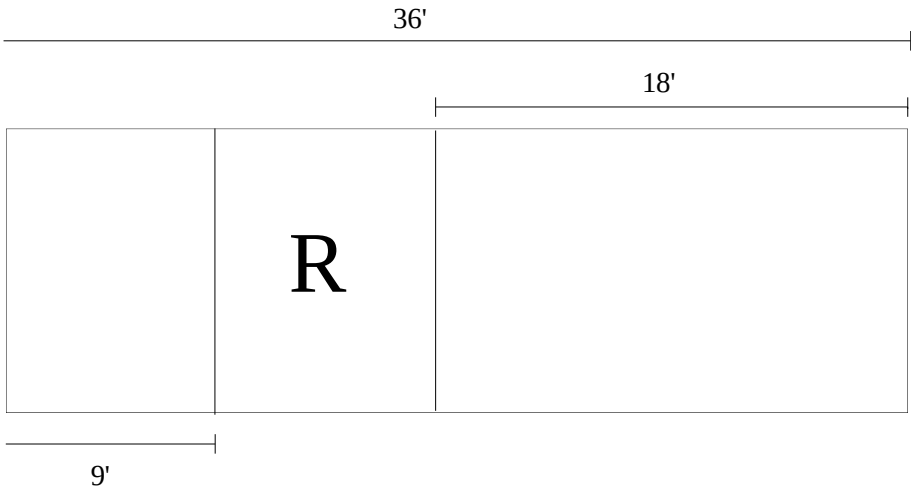
3. 1/3 ÷ 1/9 =

   A. 1/27
   B. 3/9
   C. 1/12
   D. 3

**Answer:** The correct answer to sample question #3 is answer choice “D”. This question requires dividing one fraction by another fraction. The simplest way to do this is to invert the numerator and denominator of the divisor, in this case, 1/9, and then multiply the two fractions. This looks like: 1/3 x 9/1 = 9/3 = 3. This is answer choice “D”.

4. In the sketch below, what is the width of the area marked “R”?

   A. 6 feet.
   B. 9 feet.
   C. 10 feet.
   D. 18 feet.



**Answer:** The correct answer to sample question #4 is answer choice “B”. The total length of the rectangle is shown as 36 feet. The areas to the left and right of the area marked "R" are shown to have lengths of 9 feet and 18 feet, respectively. Therefore, the necessary computation is: 36 - (9 + 18) = 9. This is answer choice “B”.

5. ? = 4.5% of 800

A. 0.4
B. 18
C. 36
D. 360

**Answer:** The correct answer to sample question #5 is answer choice “C”. In multiplying a value by a percentage, it is necessary to express the percentage in its decimal form. That form of 4.5% is .045. Once this conversion is done correctly, the arithmetic is simply: .045 x 800 = 36. This is answer choice “C”.

## EXAMINATION SECTION 2: VOCABULARY

This examination section contains six (6) questions designed to assess your understanding of the terminology that is relevant to basic engineering concepts and work activities. You should read each question carefully, draw upon your knowledge of basic engineering topics, and thoughtfully consider the answer choices. Depending on your current knowledge and experience, additional preparation for doing your best on this part of the exam would be to review some references that include basic engineering terminology prior to taking the examination.

Examples of these types of questions are shown below. The sample questions are followed by brief explanations of their correct answers.

6. Encumbrance means the same or most nearly the same as:

   A. lien.
   B. luxury.
   C. office holder.
   D. enforcement.

**Answer:** The correct answer to sample question #6 is answer choice "A". The term encumbrance refers to the legal rights to real property of parties other than the property owner. The term lien is often used synonymously with encumbrance or may be provided as a primary example of an encumbrance.

7. Contour means the same or most nearly the same as:

   A. outline.
   B. circular.
   C. silhouette.
   D. oddly shaped.

**Answer:** The correct answer to sample question #7 is answer choice "A". A contour is the outline or defining edge of a shape, object, or body.

8. Easement means the same or most nearly the same as:

   A. reduction.
   B. relaxation.
   C. moderation.
   D. right of way.

**Answer:** The correct answer to sample question #8 is answer choice "D". An easement is a right to use someone's land for a specific purpose. Easements are most often granted to entities for their crossing of private property for public purposes. Examples include utility easements that are awarded for construction and maintenance of utility lines.

## EXAMINATION SECTION 3: SURVEY

This examination section contains seven (7) questions designed to assess your knowledge of basic land surveying concepts. The appropriate approach to questions in this part of the exam will depend on your current knowledge of land surveying. If you are experienced in performing or assisting with surveying tasks, you may answer these questions based on your current information and knowledge. Otherwise, you may want to prepare for this part of the exam by reviewing survey concepts and terminology in textbooks, other survey references, or online resources. In either case, be sure you carefully read and understand each question before you answer it.

Examples of these types of questions are shown below. The sample questions are followed by brief explanations of the correct answers.

**Instructions:** The following information should be used in answering sample questions 9 and 10.

The points on survey lines are called stations and are identified with a station mark on a stake. The starting point is designated as 0 + 00. The station 100 feet from the starting point is marked as 1 + 00 and the station a distance of 100 feet from that station is marked as 2 + 00. A point 50 feet further on the survey line would be marked as 2 +50 and a point one-half foot further would be shown as 2 + 50.5.

9. The station mark on a stake that is seventeen hundred twenty-five and a half feet from the starting point of a survey line should be:

   A. 17.25
   B. 1,725.5
   C. 17 + 25
   D. 17 + 25.5

**Answer:** The correct answer to sample question #9 is answer choice “D”. The seventeen hundred feet is marked as 17 and is followed by + 25.5 to designate the additional distance that is less than 100 feet.

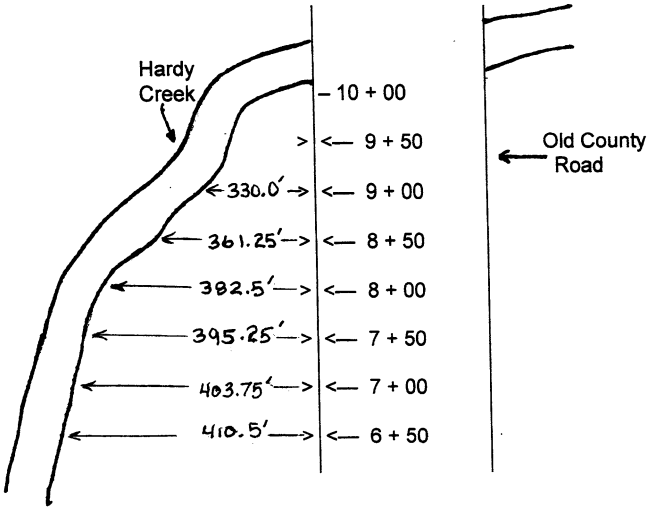
10. What is the distance between stations marked as 402 + 75 and 445 + 50?

   A. 4,225 feet.
   B. 4,275 feet.
   C. 4,325 feet.
   D. 4,375 feet.

**Answer:** The correct answer to sample question #10 is answer choice “B”. The station marked 402 + 75 is 40,275 feet from the starting point and the station marked 445 + 50 is 44,550 feet from the starting point. The distance between the two stations is computed as: 44,550 - 40,275 = 4,275 feet.

11. The survey sketch below shows the perpendicular distance from Old County Road to Hardy Creek at several stations on the survey line along the road. According to the information provided in the sketch, the perpendicular distance from the road to the creek at station 7 + 75 is:

A. greater than 395 feet, but less than 405 feet.
B. greater than 380 feet, but less than 395 feet.
C. greater than 360 feet, but less than 380 feet.
D. greater than 330 feet, but less than 360 feet.




**Answer:** The correct answer to sample question #11 is answer choice “B”. The station marked 7 + 75 is half-way between station 7 + 50, which is 395.25 feet from the creek, and station 8 + 00, which is 382.50 feet from the creek. From the sketch, it is clear that the distance from the road to the creek is decreasing as the survey line advances. Therefore, the distance to the creek at Station 7 + 75 is clearly shorter than 395.25 feet, the distance at station 7 + 50, and longer than 382.5 feet, the distance at station 8 + 00. Only answer choice "B" describes a range that meets these requirements.

## EXAMINATION SECTION 4: FOLLOWING INSTRUCTIONS

This examination section contains thirteen (13) questions designed to assess your ability to read and follow written instructions.

Some instructions will be presented in a narrative form that involves a writing style that is similar to receiving information orally from a supervisor. You will read a passage that includes work-task instructions. Then, you will respond to questions that ask you to identify the correct actions to take given specific circumstances and the instructions provided. It is important that you select your answers solely based upon the information provided. Therefore, a good strategy to use for these questions is to read through the entire passage, then read each of the questions, and finally refer back to the information as you answer each question. When reading each question, determine what information the question is specifically looking for by giving careful consideration to each of the words used to convey meaning. For example, does the question use words that identify certain actions, locations, or process steps?

The remaining questions in this examination section involve using a diagram that is a grid that has been divided into sections identified by letters. Each question will provide you with a starting location and directional instructions which you will then use to determine the ending location on the grid. To answer these questions, you must be able to determine cardinal directions (compass points) based on a given starting point. For example, if you know that you are headed west and are told to go south, should you turn right or left? It is also important that you accurately count the spaces in the grid in order to exactly follow the instructions provided.

Examples of these types of questions are shown below. The sample questions are followed by brief explanations of the correct answers.

**Instructions:** Use the information below to answer sample questions #12 and #13.

It is your first day on the job and your supervisor gives you the following instructions:

"I'd like you to sort through the building permit applications that have come in over the past two weeks. Applications can be submitted electronically, by mail, or in person at the front counter. Electronic applications have been printed and all applications are placed in separate bins located near the department mail slots. The electronic applications are in the bin labeled BP-EA. Applications received by mail are in the bin labeled BP-MA. Applications received at the counter are in the bin labeled BP-CA.

You must write a code on the top right corner of each application to indicate how it was received. The code for electronic receipt is 10, the code for mail-in receipt is 20, and the code for in-person receipt is 30. After writing the code on an application, you must then enter an identification number for the application into the Permit Application Log that is located next to the application bins. The identification number for an application has three parts. It is the month that the application was received, followed by the code for the manner in which the application was filed, followed by the code for the Division that the application is given to for processing. So, a typical code should be something like 06-10-25 meaning that the application was received in June electronically and was given to Division B.

Finally, place the application into the correct mail slot according to the type of property that the permit is for. Applications for building permits in residential areas are placed in the mail slot for Division A and their code for the identification number is 15. Applications for commercial building permits go in the mail slot for Division B and their code is 25. Applications for industrial building permits should be placed in the mail slot for Division C and their code is 35."

12. What should be written on a permit application that was received electronically in August for work at a commercial property?

A. 10
B. 25
C. BP-EA
D. 08-10-25

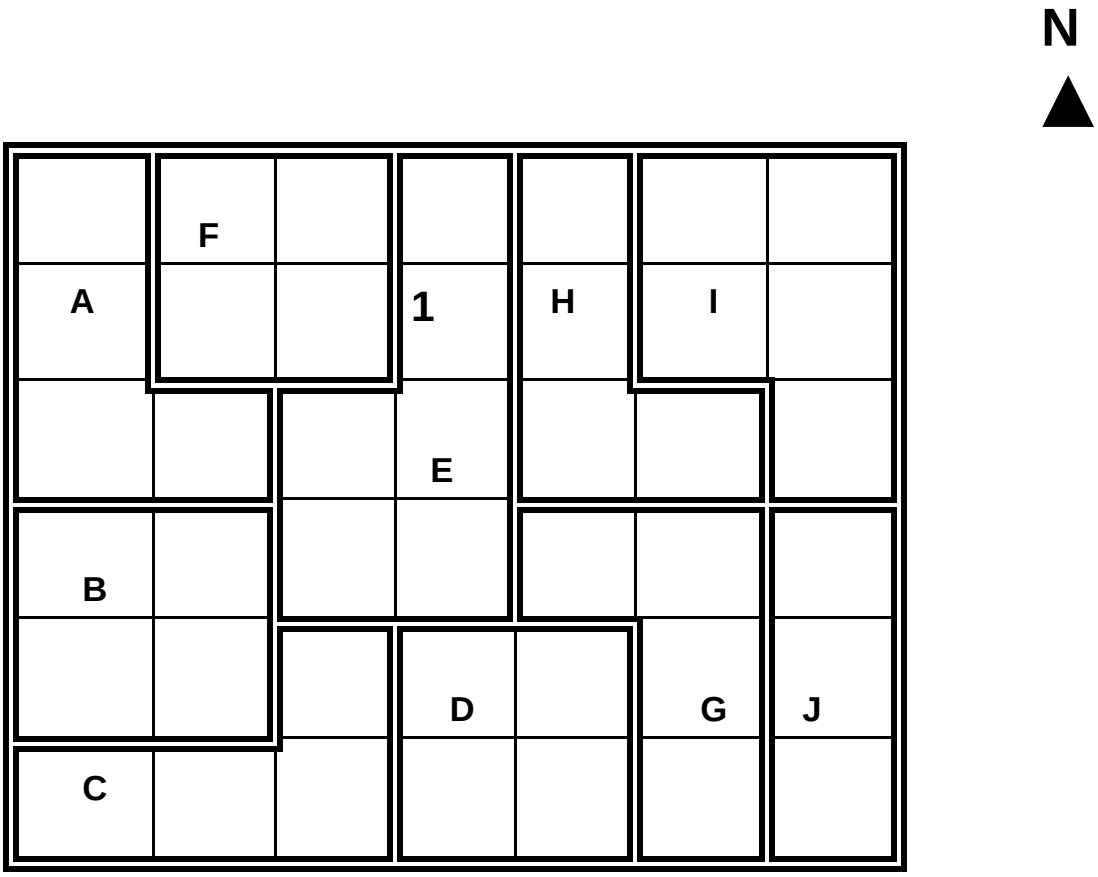
**Answer:** The correct answer to sample question #12 is answer choice “A”. The first two sentences of second paragraph of the instruction passage provide direction on what should be written on the permit applications stating that “You must write a code on the top right corner of each application to indicate how it was received. The code for electronic receipt is 10...”. Therefore, “10” is the correct answer to the question.

13. What identification number should be written in the log book for a permit application that was received in October at the front counter for work to be done on a residential property?

A. 10-CA-15
B. 10-15-30
C. 10-30-15
D. 30-10-10

**Answer:** The correct answer to sample question #13 is answer choice “C”. The instruction passage indicates that the identification number for the Permit Application Log is “the month that the application was received, followed by the code for the manner in which the application was filed, followed by the code for the Division that the application is given to for processing”. If the month is October, then the first part of the identification number is “10”. This eliminates response choice “D” from consideration. The code for the second part of the identification number (the manner in which the application was submitted) is found in the second line of the second paragraph and is 30 for in-person delivery of the application. Finally, the code for the Divisions is found in the third paragraph and is 15 for residential permits. This makes the correct code 10-30-15 as shown in response choice “C”.

**Instructions:** Use the diagram below to answer sample question #14.




14. Beginning at point 1, go east one unit, then two units south, southwest (diagonally) one unit, and west two units. At this point you are in what lettered section?

    A. B
    B. C
    C. D
    D. G

**Answer:** The correct answer to sample question #14 is answer choice "B". The first step in determining the answer to the question is to familiarize yourself with the diagram. In doing this, you will see that the diagram is a grid and that the bold lines designate sections that are identified by letters. You should also note that in the upper right corner, just above the diagram, is the letter "N" with an

arrow pointing upward. This tells you that the top of the grid is north, which then allows you to determine the remaining cardinal points of south (directly opposite from north), east (to the right), and west (to the left).

Upon locating the starting point which is identified as “1”, the instruction to go east one unit means to move one square to the right. This places you in the square that designates section H. Then, the instruction to go south two units means that you should move straight down two squares. This places you in the top left square of section G. The next instruction to move southwest one unit means to move diagonally down and to the left. This will place you in upper left corner of section D. Finally, the instruction to go west two units means to move two squares to the left. This makes your final destination the lower right square of section B.

## ADDITIONAL ASSISTANCE

If you feel that you would benefit from more practice, your local library or relevant Internet web sites may have reference materials that can be helpful. This is true for all of the subject areas covered by the Engineering Aide Trainee written examination.